

The Nature of Matter Lab 1: Density of Water

Introduction

In this lab, students will explore an intensive physical property called density. From their findings, students should be able to describe how density changes based on the quantity of a sample. The concept of density can help explain why a cruise ship weighing hundreds of pounds can stay afloat on the ocean and yet a paperclip weighing only one gram will sink to the bottom.

Question / Aim: What is the density of what and how does the density of water change as the volume of water changes

Independent Variable: Volume of water

Dependent Variable: Mass of water

Controlled Variable(s): type of water, graduated cylinder

Hypothesis

The density of water will increase as the volume of water increases

The density of water will decrease as the volume of water increases

The density of water will remain constant as the volume of water increases.

Design

Supply List

Graduated cylinder, digital scale, distilled water

Procedure

1. Obtain a graduated cylinder and mass it on the triple beam balance or digital scale.
2. Fill the graduated cylinder with a random amount of water. Record the volume of water indicated by the graduated cylinder
3. Record the mass of the graduated cylinder with the measured volume of water.
4. Determine the mass of the water by taking the total mass of the graduated cylinder with the water and subtracting your original mass of the graduated cylinder.

Results

Overview

The data collected in the lab were quantitative values. Density is considered the amount of mass present in a given amount of volume. The mass of water was found by taking the mass of the graduated cylinder with water in it and subtracting the mass of an empty graduated cylinder.

Create an XY scatter graph. Be sure that you label your chart, label your axis, and include a trendline for your data.

Presentation

Volume (mL)	Total Mass (g)	Water Mass (g)
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Evaluating Results

Conclusion

1. What type of relationship do you notice about the volume and mass of water?
2. How does the shape of the graph show this?
3. Find the numerical value of the slope of your trendline.
4. What are the units of your trendline?
5. The trendline represents a term called density. Looking at the trendline of your graph. Do you think the density of water will change for large amounts of water or small amounts of water? Why or why not?